

What is claimed is:

- 5w
A
- 1 1. A method of organizing image data forming a picture
 - 2 image defined by a plurality of levels, each level including
 - 3 a plurality of subpicture areas corresponding to a different
 - 4 level of image data resolution relative to image data
 - 5 resolution levels corresponding to subpicture areas in other
 - 6 levels, the method comprising:
 - 7 receiving a subpicture element having image data for
 - 8 inclusion in the picture image;
 - 9 identifying a subpicture area in which the subpicture
 - 10 element may be placed, the identified subpicture area being
 - 11 in the lowest possible level of the picture image;
 - 12 placing the image data of the subpicture element in the
 - 13 identified subpicture area;
 - 14 upon a determination that the amount of image data in
 - 15 the identified subpicture area exceeds a predetermined
 - 16 maximum amount following the step of placing, identifying
 - 17 overlapping subpicture areas in a level corresponding to the
 - 18 next higher image data resolution level that overlaps the
 - 19 identified subpicture area; and
 - 20 following the step of identifying, placing image data
 - 21 of one or more subpicture elements from the identified

22 subpicture area into at least one of the overlapping
23 subpicture areas from subpicture.

1 2. The method of claim 1, further comprising:
2 repeating the steps of selecting a subpicture element,
3 identifying a subpicture area, placing the image data,
4 identifying overlapping subpicture areas and placing one or
5 more subpicture elements for a new subpicture element.

1 3. The method of claim 1, further comprising:
2 upon a determination that the amount of image data in
3 the identified subpicture area exceeds a predetermined
4 maximum amount following the step of placing and that the
5 identified subpicture area is in a level corresponding to a
6 highest image data resolution level, redefining the
7 subpicture areas of the picture image.

1 4. The method of claim 1, further comprising:
2 upon a determination that the number of overlapping
3 subpicture areas is zero, redefining the subpicture areas of
4 the picture image.

1 5. The method of claim 1, further comprising:
2 upon a determination that the amount of image data in
3 the identified subpicture area exceeds the predetermined
4 maximum following the step of placing image data of one or
5 more subpicture elements, redefining the subpicture areas of
6 the picture image.

1 6. The method of claim 1, wherein:
2 the at least one of the overlapping subpicture areas
3 comprise the overlapping subpicture areas that are capable
4 of receiving image data from the identified subpicture area
5 so that the amount of image data in the identified subpicture
6 area is less than the predetermined maximum amount.

1 7. The method of claim 1, further comprising:
2 selectively redefining the subpicture areas of the
3 picture image.

1 8. The method of claim 7, further comprising:
2 initially receiving a picture scheme for the picture
3 image defining the subpicture areas within the levels;
4 wherein the step of selectively redefining comprises:
5 extracting placed subpicture elements;
6 receiving a new picture scheme for a new picture
7 image; and
8 repeating the steps of selecting a subpicture
9 element, identifying a subpicture area, placing the image data,
10 identifying overlapping subpicture areas and placing one or
11 more subpicture elements for each of the extracted subpicture
12 elements.

1 9. The method of claim 1, further comprising:
2 identifying the overlapping subpicture area capable of
3 receiving the greatest amount of image data from the identified
4 subpicture area; and
5 upon a determination that the amount of image data in the
6 identified subpicture area less the greatest amount of image
7 data exceeds a predetermined minimum amount following the step
8 of placing, redefining the subpicture areas of the picture
9 image.

1 10. The method of claim 1, wherein:
2 following the step of identifying overlapping subpicture
3 areas, placing image data of one or more subpicture elements
4 into the at least one subpicture area from one or more
5 subpicture areas that overlap the at least one subpicture area
6 in a next level corresponding to a lower image data resolution
7 level.

1 11. A computer software product for a graphics display
2 system that organizes image data forming a picture image
3 defined by a plurality of levels, each level including a
4 plurality of subpicture areas corresponding to a different
5 level of image data resolution relative to image data
6 resolution levels corresponding to subpicture areas in other
7 levels, the computer software product including instructions
8 for:

9 receiving a subpicture element having image data for
10 inclusion in the picture image;

11 identifying a subpicture area in which the subpicture
12 element may be placed, the identified subpicture area being
13 in the lowest possible level of the picture image;

14 placing the image data of the subpicture element in the
15 identified subpicture area;

16 upon a determination that the amount of image data in
17 the identified subpicture area exceeds a predetermined
18 maximum amount following the instruction for placing,
19 identifying overlapping subpicture areas in a level
20 corresponding to the next higher image data resolution level
21 that overlaps the identified subpicture area; and

22 following the instruction for identifying, placing image
23 data of one or more subpicture elements from the identified

24 subpicture area into at least one of the overlapping
25 subpicture areas.

1 12. The computer software product of claim 11, further
2 comprising an instruction for:
3 repeating the instructions of selecting a subpicture
4 element, identifying a subpicture area, placing the image
5 data, identifying overlapping subpicture areas and placing
6 one or more subpicture elements for a new subpicture element.

1 13. The computer software product of claim 11, further
2 comprising an instruction for:
3 upon a determination that the amount of image data in
4 the identified subpicture area exceeds a predetermined
5 maximum amount following the instruction for placing and that
6 the identified subpicture area is in a level corresponding to
7 a highest image data resolution level, redefining the
8 subpicture areas of the picture image.

1 14. The computer software product of claim 11, further
2 comprising an instruction for:

3 upon a determination that the number of overlapping
4 subpicture areas is zero, redefining the subpicture areas of
5 the picture image.

1 15. The computer software product of claim 11, further
2 comprising an instruction for:

3 upon a determination that the amount of image data in
4 the identified subpicture area exceeds the predetermined
5 maximum following the instruction for placing image data of
6 one or more subpicture elements, redefining the subpicture
7 areas of the picture image.

1 16. The computer software product of claim 11, wherein:

2 the at least one of the overlapping subpicture areas
3 comprise the overlapping subpicture areas that are capable of
4 receiving image data from the identified subpicture area so
5 that the amount of image data in the identified subpicture
6 area is less than the predetermined maximum amount.

1 17. The computer software product of claim 11, further
2 comprising an instruction for:
3 selectively redefining the subpicture areas of the
4 picture image.

1 18. The computer software product of claim 17, further
2 comprising an instruction for:
3 initially receiving a picture scheme for the picture
4 image defining the subpicture areas within the levels;
5 wherein the instruction for selectively redefining
6 comprises:
7 extracting placed subpicture elements;
8 receiving a new picture scheme for a new picture
9 image; and
10 repeating the instructions of selecting a subpicture
11 element, identifying a subpicture area, placing the image
12 data, identifying overlapping subpicture areas and placing
13 one or more subpicture elements for each of the extracted
14 subpicture elements.

1 19. The computer software product of claim 11, further
2 comprising an instruction for:

3 identifying the overlapping subpicture area capable of
4 receiving the greatest amount of image data from the
5 identified subpicture area; and

6 upon a determination that the amount of image data in
7 the identified subpicture area less the greatest amount of
8 image data following the instruction for placing exceeds a
9 predetermined minimum amount, redefining the subpicture areas
10 of the picture image.

1 20. The computer software product of claim 11, wherein:
2 image data in each subpicture area is individually
3 transportable between memory in the graphics display system
4 and display monitor device therein.

1 21. A graphics display system for organizing image data
2 forming a picture image defined by a plurality of levels,
3 each level including a plurality of subpicture areas
4 corresponding to a different level of image data resolution
5 relative to image data resolution levels corresponding to
6 subpicture areas in other levels, comprising:

7 a processor; and

8 a memory device having computer software code stored
9 therein, the processor and the memory device being capable
10 of:

11 identifying a subpicture element having image data
12 for inclusion in the picture image;

13 identifying a subpicture area in which the subpicture
14 element may be placed, the identified subpicture area being
15 in the lowest possible level of the picture image;

16 placing the image data of the subpicture element in the
17 identified subpicture area;

18 upon a determination that the amount of image data in
19 the identified subpicture area exceeds a predetermined
20 maximum amount following the placing, identifying overlapping
21 subpicture areas in a level corresponding to the next higher
22 image data resolution level that overlaps the identified
23 subpicture area; and

24 following the identifying, placing image data of one or
25 more subpicture elements from the identified subpicture area
26 into at least one of the overlapping subpicture areas.

1 22. The graphics display system of claim 21, wherein the
2 processor and memory device being further capable of:

3 repeating the selecting a subpicture element,
4 identifying a subpicture area, placing the image data,
5 identifying overlapping subpicture areas and placing one or
6 more subpicture elements for a new subpicture element.

1 23. The graphics display system of claim 21, wherein the
2 processor and memory device being further operable for:

3 upon a determination that the amount of image data in
4 the identified subpicture area exceeds a predetermined
5 maximum amount following the placing and that the identified
6 subpicture area is in a level corresponding to a highest
7 image data resolution level, redefining the subpicture areas
8 of the picture image.

1 24. The graphics display system of claim 21, wherein the
2 processor and memory device being further operable for:
3 upon a determination that the number of overlapping
4 subpicture areas is zero, redefining the subpicture areas of
5 the picture image.

1 25. The graphics display system of claim 21, wherein the
2 processor and memory device being further operable for:
3 upon a determination that the amount of image data in
4 the identified subpicture area exceeds the predetermined
5 maximum following the placing of image data of one or more
6 subpicture elements, redefining the subpicture areas of the
7 picture image.

1 26. The graphics display system of claim 21, wherein:
2 the at least one of the overlapping subpicture areas
3 comprise the overlapping subpicture areas that are capable of
4 receiving image data from the identified subpicture area so
5 that the amount of image data in the identified subpicture
6 area is less than the predetermined maximum amount.

1 27. The graphics display system of claim 21, wherein the
2 processor and memory device being further operable for:
3 selectively redefining the subpicture areas of the
4 picture image.

1 28. The graphics display system of claim 27, wherein the
2 processor and memory device being further operable for:
3 initially receiving a picture scheme for the picture
4 image defining the subpicture areas within the levels;
5 wherein the selectively redefining comprises:
6 extracting placed subpicture elements;
7 receiving a new picture scheme for a new picture
8 image; and
9 repeating the selecting a subpicture element,
10 identifying a subpicture area, placing the image data,
11 identifying overlapping subpicture areas and placing one or
12 more subpicture elements for each of the extracted subpicture
13 elements.

1 29. The graphics display system of claim 21, wherein the
2 processor and memory device being further operable for:
3 identifying the overlapping subpicture area capable of
4 receiving the greatest amount of image data from the
5 identified subpicture area; and
6 upon a determination that the amount of image data in
7 the identified subpicture area less the greatest amount of
8 image data exceeds a predetermined minimum amount following
9 the step of placing, redefining the subpicture areas of the
10 picture image.